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(S//REL TO USA, FVEY) IR.21 – A Technology
Warning Mechanism

SDC2010

SSG4/T3C Technical Director

Derived From: NSA/CSSM I-52

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Classification

- ▶ This briefing is classified:
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(U//FOUO) Today's Agenda

- ▶ (U) Emerging Operating Model for Trends and Forecasting
- ▶ (U) Wireless Evolution Paths

- ▶ (S//REL TO USA, FVEY) Analytic Framework
- ▶ ...and Process

- ▶ (S//REL TO USA, FVEY) Meet AURORAGOLD

- ▶ (U) An Invitation to Join – Your Use Cases...
 - ▶ Includes Home Work Assignments...

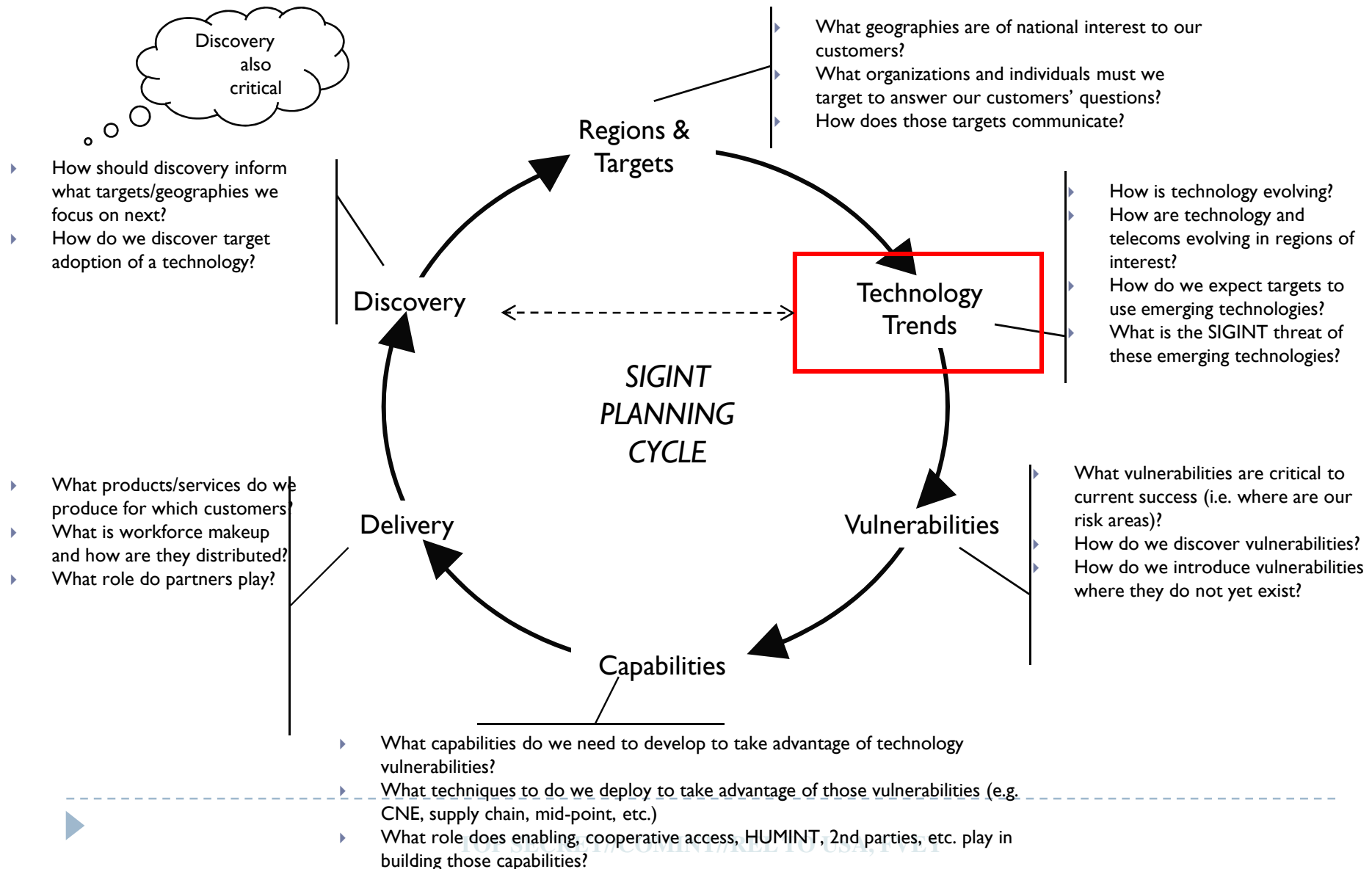




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(U//FOUO) Effective Forecasting: Geopolitical Regions and Targets





(U) Two Types of Investigations

- ▶ (S//REL TO USA, FVEY) **Horizon Scanning**
 - ▶ Objective: Initial identification and assessment
 - ▶ All source research
 - ▶ Answer the question: Does this technology appear to be a large risk to the SIGINT system? Why or why not?

 - ▶ (S//REL TO USA, FVEY) **Deep Dive**
 - ▶ Objective: Cause a funding decision(s)
 - ▶ All source research; emphasis on geographic uptake trends; target uptake plans or vignettes.
 - ▶ Answer the question: Are SIGINT targets taking up this technology? How *fast*?
 - ▶ Implicitly contrast the above with the *cost and time* needed to remediate any SIGINT system shortfalls.
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(U) Trends and Forecasts: A Geo-temporal Tracking Problem

- ▶ (U) **Forecast:**
 - ▶ “An estimation of a Future Condition” ...
 - ▶ “To calculate or predict some future event or condition usually as a result of the analysis of available pertinent data” – Merriam Webster

- ▶ (U) **Trend:**
 - ▶ “To extend in a general direction; follow a general course”
– Merriam Webster

- ▶ (U) **By necessity, a trend-line requires measurement of understood variables across time.**



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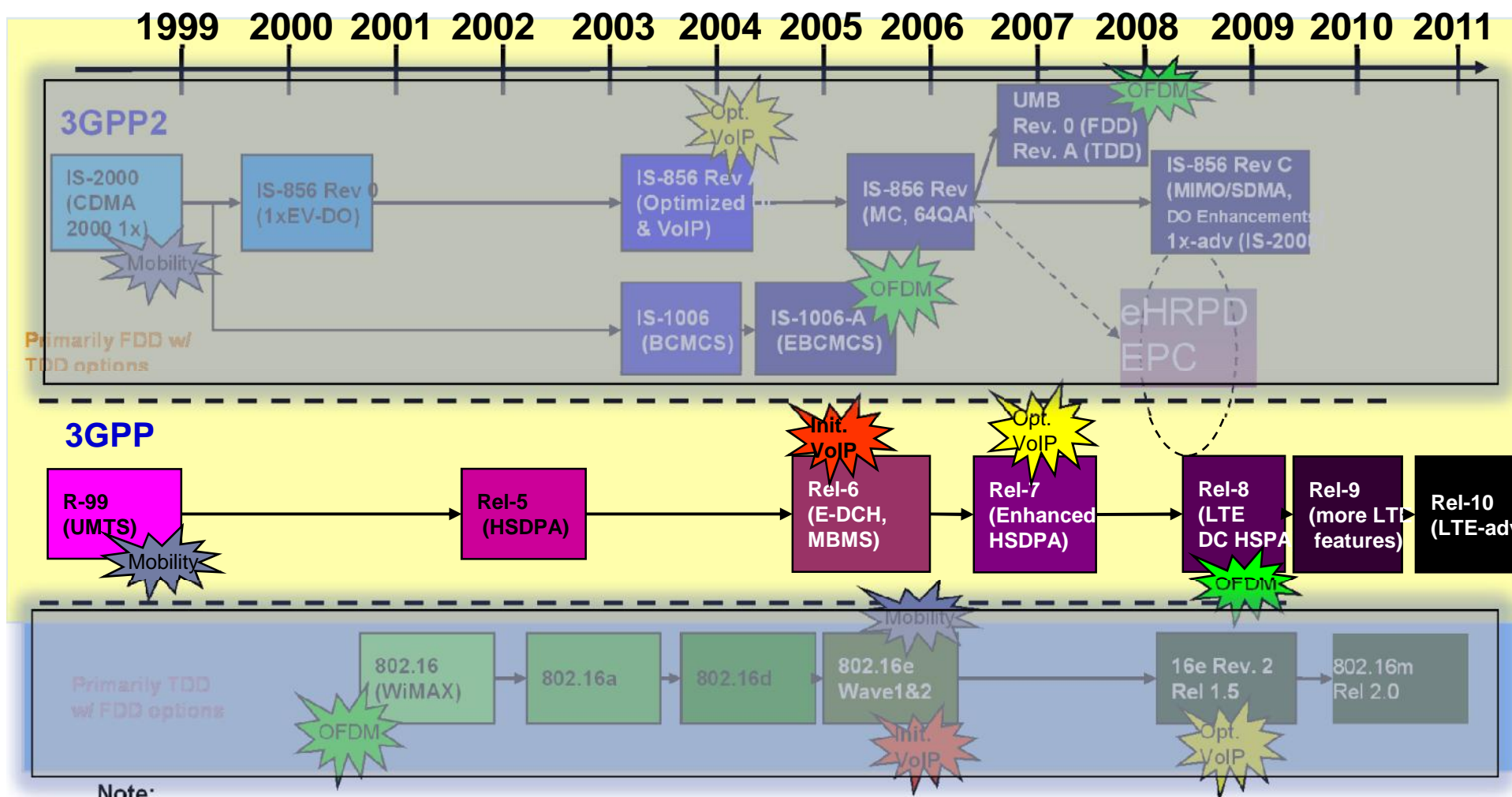


(U) Roaming Agreements

- ▶ (U) Allow a mobile subscriber to use resources on a visited network
 - ▶ Each carrier's IR.21 is a technical document that:
 - ▶ Describes the operator itself in various ways
 - Location, business codes, etc.
 - ▶ Describes access to the IP network of the operator
 - DNS, IP addresses, ASN, etc.
 - ▶ Describes:
 - Radio Access Network: technology(ies) type(s)
 - Frequency(ies)
 - Telephony routing information (MSISDN ranges; E.212)
 - SCCP gateways (Point codes)
 - Mobile Application Part protocol in use
 - Hardware, software versions of certain network elements...
- ▶ (S//REL TO USA, FVEY) Hypothesis: We can identify and track a carrier's technical evolution with IR.21 and other data.



(U) 3G Wireless Standards Evolution – Overview

**Note:**

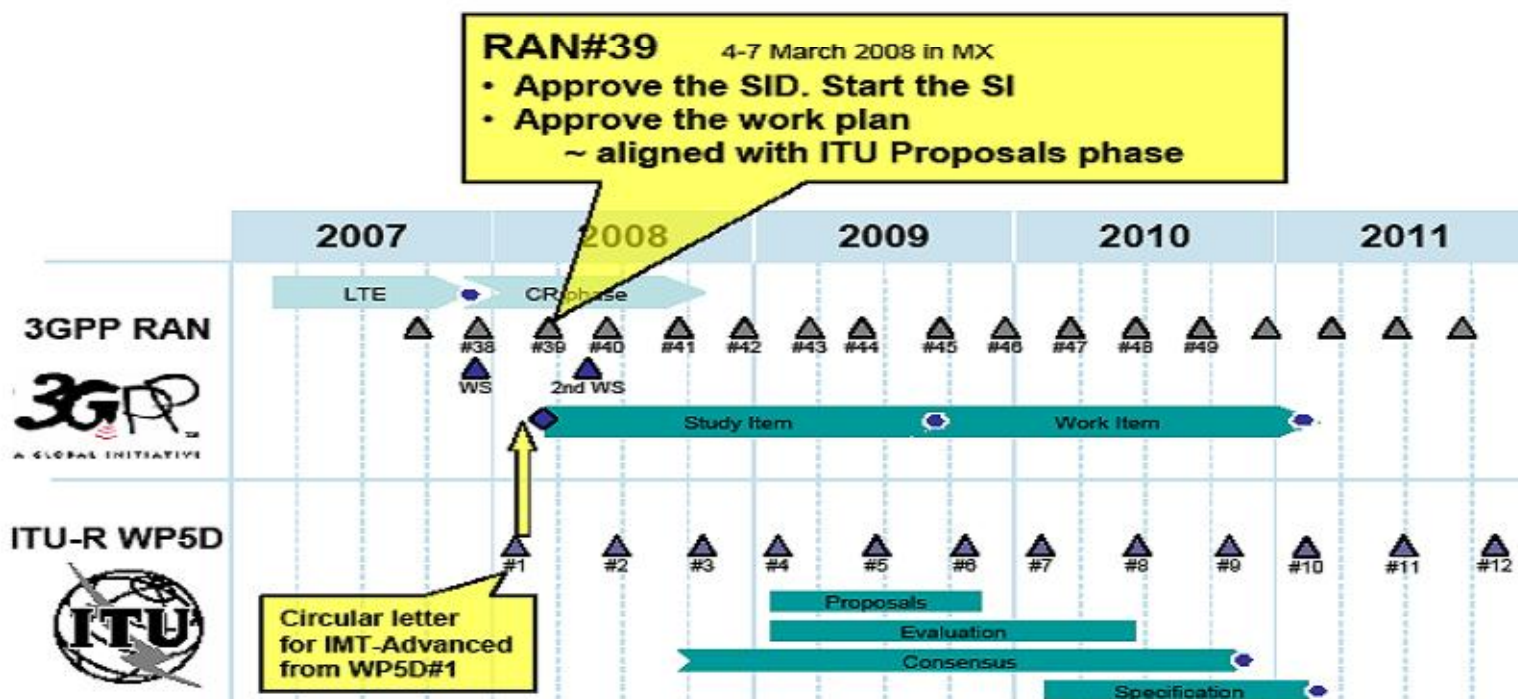
- **Dates shown are standards completion dates** (or expected completion dates.)
- “Initial VoIP” not as spectrally efficient as “Optimized VoIP”.
- “Mobility” indicates when each particular standard supports mobility inter-operability between the terminal and BTS.



(U) And What About 4G?

- ▶ (U) **IMT-adv** is an **ITU** led effort to set requirements for next gen. mobile networks
 - ▶ Just as ITU's IMT-2000 defined 3G, ITU's IMT-adv will define 4G

Proposed 3GPP Work Plan





(U) Framework for Analysis...

▶ (U) 3GPP: Defines technology migration paths.

▶ “Releases” – A Clear Technology Roadmap

- 3G begins with Release 99
- Other releases: 04, 05, 06, 07, 08, 09,10, 11 (future)
 - See: www.3gpp.org/ftp/Information/WORK_PLAN/Description_Releases/
- Releases cover:
 - Access: GSM, EDGE, HSPA, LTE, LTE-Advanced, etc.
 - Core: GSM Core, Enhanced Packet Core...
 - Services: MS, etc.



▶ (U) GSMA: Defines carrier information exchange required to enable roaming

- Changes to IR.21 format warn of imminent technology roll-out
- An IR.21 is a GSMA-mandated document. IR.21 are exchanged between Wireless operators with roaming agreements, to the GSMA, and to certain clearing house operations.



(U) Analytic Process

- ▶ (S//REL TO USA, FVEY) **Data analysis process is to match information in IR.2I, or elsewhere, against Releases in the Technology Roadmap**

- Example: CAMEL Phase 4 (aka CAMEL4) as proxy for Release 5 deployment

- ▶ (S//REL TO USA, FVEY) **Analytic goals:**

- ▶ Establish a date-time for a release deployment
 - ▶ Track releases at the per network level
 - ▶ Display status at the national, regional, hemispheric or global scale
 - ▶ Measure speed of adoption at each scale
 - ▶ Identify early and late adopter tendencies by network

- ▶ (S//REL TO USA, FVEY) **Deliverables:**

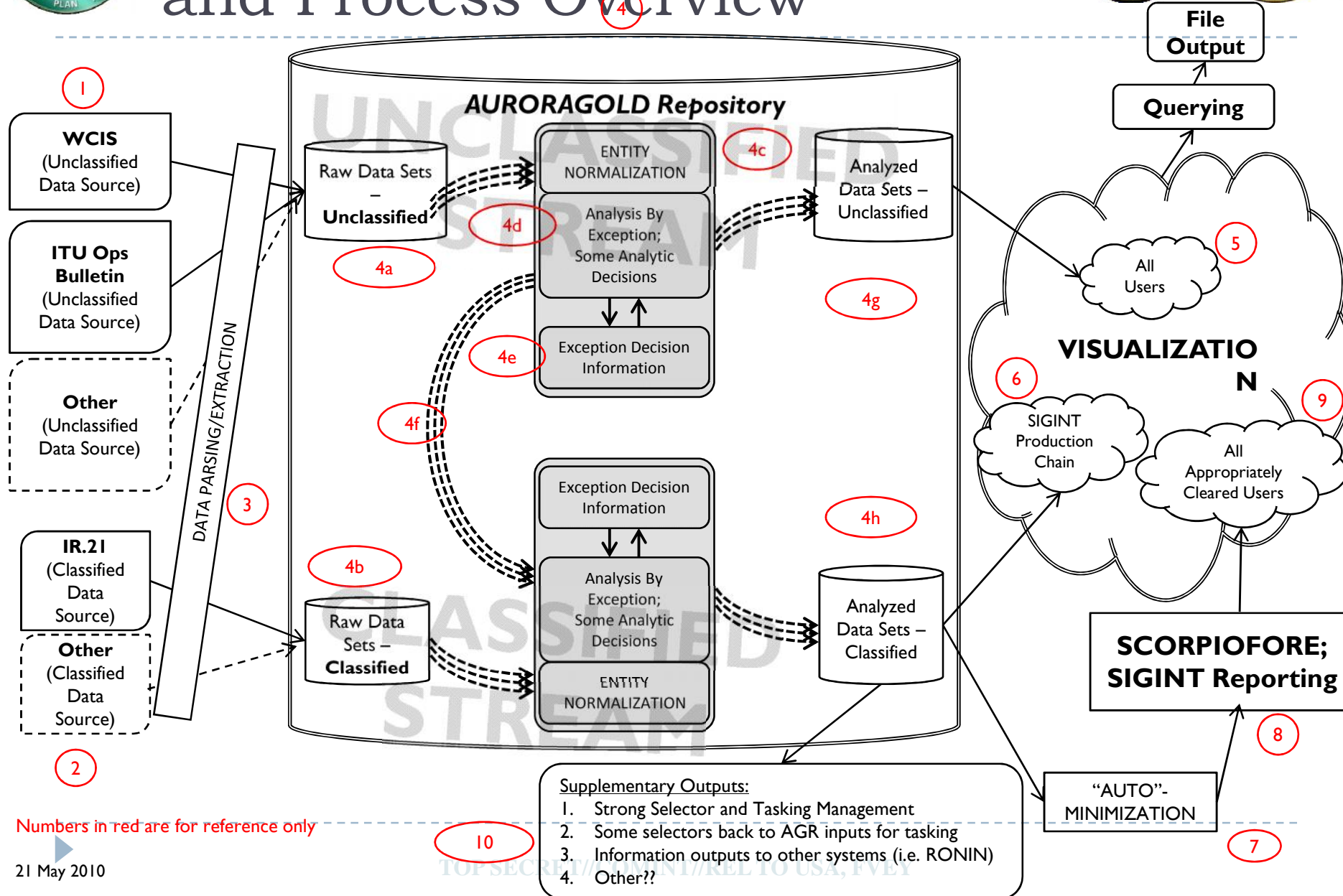
- ▶ Adoption trends over time
 - ▶ Forecasts derived from trends and framework changes

- ▶ ▶ Formal reporting of data and conclusions — as a dataset



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(TS//SI//REL TO USA, FVEY) Data Flow and Process Overview

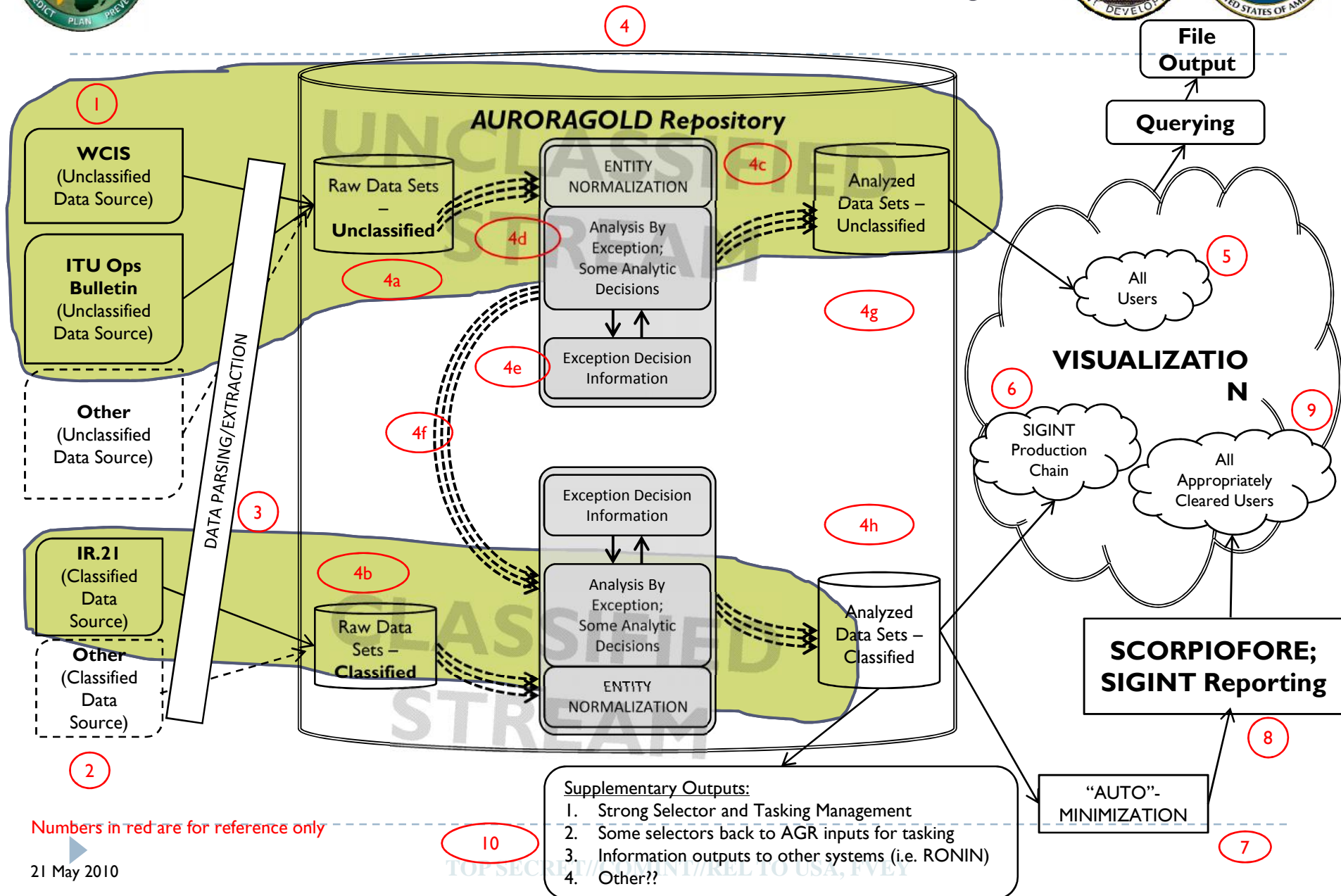




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What Is Done Today



Numbers in red are for reference only

21 May 2010



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(S//REL TO USA, FVEY) Information Delivery Vehicles – At NSA



- ▶ (S//SI//REL TO USA, FVEY) Mobile IP Information:



- ▶ (S//SI//REL TO USA, FVEY) Telephony and Provider information:



- ▶ (S//REL TO USA, FVEY) Worldwide Wireless Market information: T3C
→ packaged for WPMO consumption
 - Drives its portfolio investment planning process
 - Affects ~80% of the portfolio (2009), per customer.
- ▶ (U) Various and sundry others ...



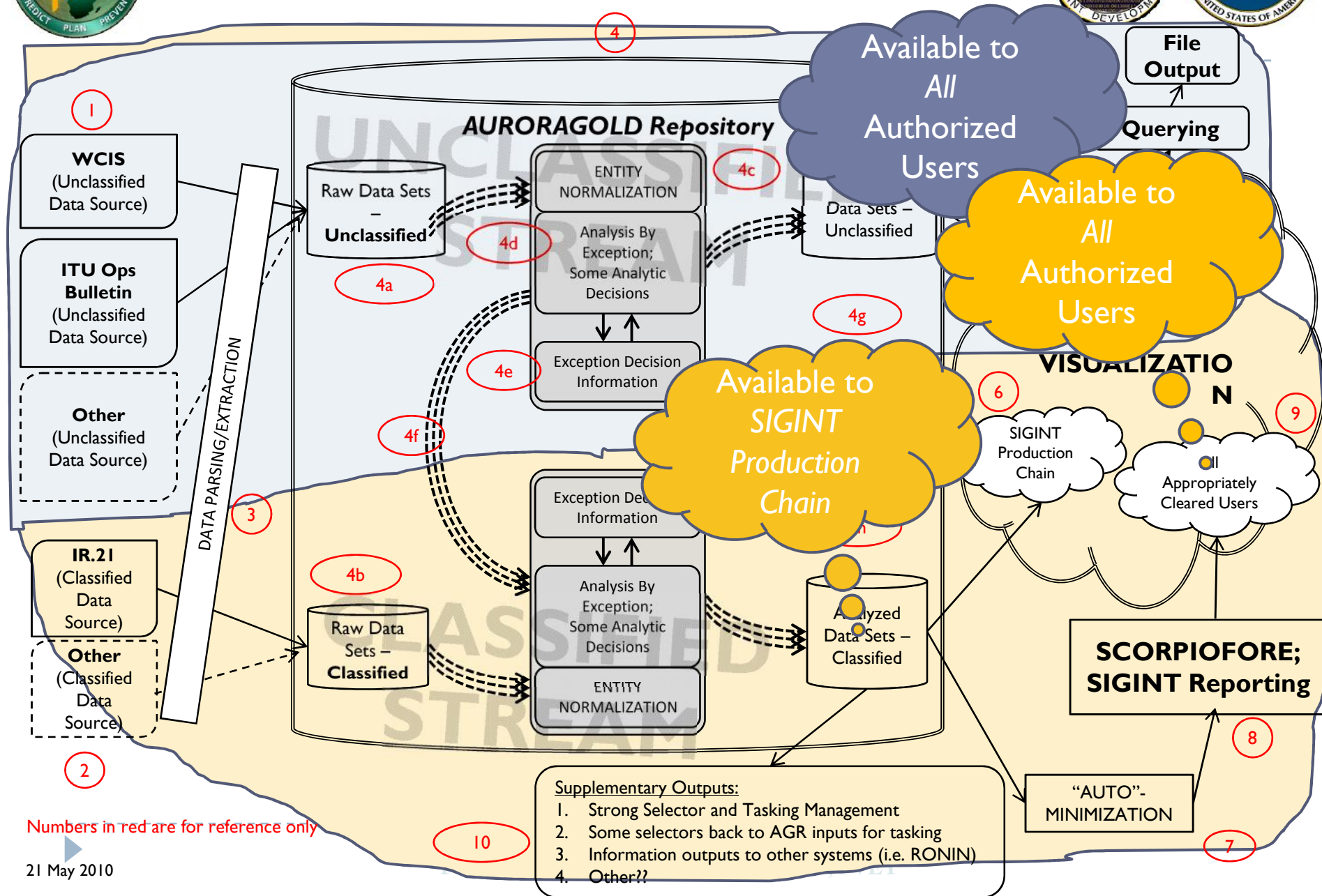
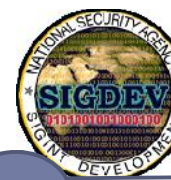
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Future Implementation





(U) Information – Now What?

- ▶ (S//REL TO USA, FVEY) **Make the data useable**
 - ▶ Available in or out of the SIGINT production chain
 - ▶ Attach flows to value-adding chains and processes
 - ▶ Deliver as a data-set
 - ▶ Recognize other data sets exist and also are part of analytic processes (federation anybody?)
 - ▶ (S//REL TO USA, FVEY) **Make the data traceable**
 - ▶ Includes auto-sourcing of data origin
 - ▶ Time-stamping
 - ▶ (S//REL TO USA, FVEY) **T3C will do technology trending and warning...**
 - ▶ (U) **Would your analytic processes benefit from this data set?**
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(U) Your Invitation to Join

- ▶ (U) **We are few; we welcome partnership.**
 - ▶ Can you help?
 - ▶ Do you have a better way?
 - ▶ Let's pull together!!

- ▶ (TS//SI//REL TO USA, FVEY) **We are preparing to measure the breadth of our access to IR.2I documents...**
 - ▶ **Goals:**
 - ☐ Do we cover all 3GPP networks?
 - ☐ Tweak access
 - ☐ Tweak selectors
 - ▶ Indexer will provide PWID for all identified IR.2I, after dedupe.



(U) What Are Your Use Cases?

- ▶ (S//REL TO USA, FVEY) This is your segment—to make the notetaker's job simpler please categorize your use case; describe impact:
 - ▶ A) IP Network
 - ▶ B) Call Control – Switched Voice
 - ▶ C) Hardware model and software version information
- Group Discussion....

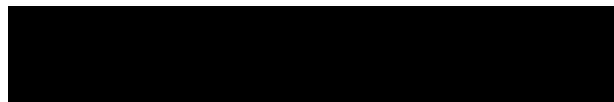




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► (U) Thank you for your time and contributions



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